THE INSTITUTE OF PHYSICS

47 BELGRAVE SQUARE, LONDON, S.W.1

BULLETIN

No. 17 — *Information in this circular is not intended for general publication: your copy should not therefore be passed to a library.* — MAY 1951

DIARY OF INSTITUTE MEETINGS

Members may bring guests to any of the meetings listed below unless otherwise indicated. Individual notification has been or will be sent to the members of the Branch or Group concerned. Other members of the Institute may obtain further particulars from the Secretary of the Institute.

Wednesday, May 16th, at 5.30 p.m., at the Institute's House, 47 Belgrave Square, London, S.W.1. **Institute Annual General Meeting.** Fellows and Associates only.

Tuesday, Wednesday, June 19th and 20th (Electron Microscopy Group), **Conference** at the University of St. Andrews.

Saturday, June 30th (Education Group), **Summer Meeting.** A visit to the Physics and Electrical Engineering Department of the **Royal Naval College, Greenwich.**

Friday, Saturday, July 20th and 21st (Education and Electronics Groups). Joint meeting at the **University of Cambridge.** On the 21st the London and Home Counties Branch will also participate. The programme includes visits to the **Engineering Laboratories and the Cavendish Laboratory.**

Monday, Tuesday, Wednesday, July 23rd, 24th, and 25th (Industrial Radiology Group) **Summer Meeting.**

INSTITUTE GRADUATESHIP EXAMINATION

The Board has accepted the recommendations of the Education Committee concerning the regulations and syllabuses of the Institute's Graduateship examination, the establishment of which had already been approved in principle by the Board. It is proposed to hold the first examination in 1952.

The establishment of the examination will serve two main purposes. Firstly, there will be provided a regular means of testing the standard of knowledge of physics of candidates for membership who are unable to provide alternative evidence satisfactory to the Board. In particular, candidates for membership holding certain academic qualifications regarded by the Board as only partially complying with the required standard of knowledge will, in future, normally be asked to take part of the Institute examination.

Secondly, the Board believes that this examination will be welcomed by Heads of technical college physics departments as offering a qualification which many students will find particularly attractive and appropriate because of the distinctive emphasis which is laid upon physics. For students taking the full examination, three papers in theoretical physics, a practical physics paper and two papers in mathematics will be compulsory. The sixth theoretical paper will be chosen by the student from the list given in the regulations printed below. Students choosing applied physics will be required to offer only one section and, again, this will be chosen by them. The sections of applied physics so far approved for examination are acoustics, temperature measurement, high vacuum technology, electronics, spectroscopy and X-rays.

Copies of the regulations and full syllabuses may be obtained (gratis) from the Deputy Secretary of the Institute.

REGULATIONS CONCERNING THE GRADUATESHIP EXAMINATION

1. Except as provided by regulation 2, an applicant for admission to the examination will be required to provide evidence satisfactory to the Board that he has followed a systematic course in physics for at least three years as a full-time student (or an equivalent period as a part-time student) at a university or at a college recognized for this purpose by the Board.

Application for admission to the examination must be made to the Secretary of the Institute on the prescribed form obtainable from him.

2. The Board may, at its discretion, require an applicant for membership of the Institute to take the whole or part of the Graduateship examination even though he does not comply with regulation 1. Admission to the examination of such candidates who do not satisfy regulation 1 will be restricted by the Board to those who have

(*a*) submitted to the Secretary of the Institute a properly completed form of application for Fellowship or Associateship of the Institute,

and (*b*) satisfied the Board that they have had suitable experience of the application or advancement of some branch or branches of physics.

3. The subjects of the examination are

(*a*) physics (three theoretical papers and a practical examination);

(*b*) mathematics (two papers—each consisting of questions on pure and applied mathematics);

(*c*) one other subject (one paper), chosen by the candidate from the following:

(i) applied physics;

(ii) more advanced physics;

(iii) mathematical physics;

(iv) statistics.

Each written paper will be of three hours' duration; the practical examination will be of six hours.

Candidates who do not already comply with the Institute regulations concerning general education must take a three-hour General paper.

4. A candidate may be required to submit notebooks containing the record of his work in practical physics, the genuineness of the record being attested by a teacher or other person approved by the Institute. Candidates may also be required to submit to *viva-voce* examination or such other test as the examiners may decide. In all written papers the examiners will take into account the candidate's ability to express himself in clear and concise English.

5. The examination will normally be held in London, but recognized colleges may apply to the Board for approval as local examination centres.

6. (*a*) The full examination fee for each entry is six guineas and this must be paid on application for admission to the examination.

(*b*) Candidates who have been invited by the Board to sit the examination and have already paid the application fee for Associateship or Fellowship will be required to pay a fee of four guineas for the full examination, or a smaller sum, to be decided by the Board, if the candidate is required to sit for only part of the examination.

(*c*) Candidates who have been Students of the Institute for two years prior to the date of the examination will be required to pay one guinea less than the amounts stated in (*a*) and (*b*) above.

7. A list of candidates who have satisfied the examiners will be issued by the Institute. The marks obtained by candidates will not be disclosed nor will the Institute enter into correspondence concerning the performance of candidates. Unless otherwise notified by the Institute, candidates are required to satisfy the examiners in all subjects at one and the same examination.

8. The passing of the Graduateship examination does not in itself entitle a candidate to be or to describe himself as a Graduate of the Institute.

9. Candidates satisfying the examiners will be entitled to a written statement from the Institute to that effect. They will be deemed to comply with such regulations governing election to Graduateship and Associateship of the Institute as concern a knowledge of physics and cognate subjects.

To be elected to any grade of membership of the Institute, they will also be required to comply with such other conditions as are stipulated by the published regulations of the Institute.

10. In determining the period of experience required for Associateship, success in the Graduateship examination will be regarded as equivalent to the holding of an approved degree at pass standard. Candidates who satisfy the examiners in the General paper will be considered to comply with the Institute's requirements for general education.

SCIENCE ABSTRACTS

There are few corporate members of the Institute to whom Science Abstracts has not been familiar from their undergraduate days. Since 1898, when it was the first journal of its kind, it has become an institution in the scientific world and this very fact has tended to obscure the much greater demands now made upon it and the increasing difficulty of meeting them except with adequate support from scientists, pure and applied.

The journals—Section A—*Physics Abstracts*, and Section B—*Electrical Engineering Abstracts*—are controlled by a Management Committee nominated by the Councils of the Institution of Electrical Engineers and the Physical Society. The executive officers are the Secretary of the I.E.E. and the Editor of Science Abstracts. The Institution of Electrical Engineers provides facilities and administration, but the financial responsibility is borne jointly by the I.E.E. and the Physical Society. The Finance Committees of these bodies, in the present writer's recollection, have not on any occasion curtailed the considered recommendations of the Management Committee.

The circulation of *Physics Abstracts* (now some 12 000) is greater than that of any similar journal. Over half the copies sold are purchased by the American Physical Society on behalf of its members, thus providing a dollar income of topical interest; the Physical Society takes copies for its members; the Institute of Physics takes a few hundred for resale to those of its members who order it for their personal use at a special rate; members of the I.E.E. subscribing through that institution take a number of copies of the same order as the Physical Society; finally, there is a fairly substantial sale to the general public, largely organizations. Over one half the copies of *Electrical Engineering Abstracts* are issued to subscribing members by the I.E.E.; the remainder are mainly sold to the general public, since other societies take only small numbers for their members. The excess of the total cost of each journal over the income from sales to the public or to other institutions is made up each year by the I.E.E. and the Physical Society, according to the number of copies taken.

The price of Science Abstracts has had to be raised substantially in recent years, but even so the cost of the service to the sponsoring bodies has multiplied to an embarrassing degree. The present position arises largely from an expansion to meet the wishes of users. In 1950 there were 9 200 Physics Abstracts and 4 400 Electrical Engineering Abstracts. With assistance from the U.S. Federal Government, the American Institute of Physics made an extensive, detailed and scientific study of the opinions of American physicists on *Physics Abstracts*. The results showed as favourable an opinion as any journal could hope for and confirmed the need for the expansion already made and for further expansion

in directions indicated. The enquiries made among the Groups and Branches of The Institute of Physics gave similar results. At a meeting arranged by U.N.E.S.C.O. at the I.E.E. last September between representatives of *Physics Abstracts*, the *Bulletin Analytique*, and the International Council of Scientific Unions, co-operation was instituted between the two services to improve coverage, reduce publication delays, economize costs, and aim at uniformity in indexing and classification.

The foregoing shows that the standard of the service given by Science Abstracts must not be reduced. The only alternative to avoid a catastrophic rise in price with rising production costs is to increase the number of subscribers. The value of *Physics Abstracts* to members of the Institute needs no emphasis. A large proportion of the Institute's membership is engaged in applied science where electronic devices, radio frequency and very high frequency techniques (including centimetre and millimetre waves), and the science of telecommunications are of paramount importance as well as the use of electric power in heavier forms. All these features are covered in *Electrical Engineering Abstracts*. Apart from the proved scientific and technical value of Science Abstracts to members of the Institute, there is the specially reduced price of £1 12 6 for either section, as compared with the retail price of £2 10 0. This reduction is to attract and to benefit individual members personally; the use of these copies in libraries or for circulation would be improper. Indeed, an abstracting service cannot economically be run mainly for libraries and the service essentially loses much of its value if divorced from immediate personal use. The importance of this use and the consequent expansion of subscribers is strongly and legitimately urged upon members of the Institute by the Board.

S. WHITEHEAD.

MANCHESTER AND DISTRICT BRANCH DINNER

The Manchester and District Branch, which has been the pioneer of so many of the activities of the Institute, once again broke new ground by holding a Branch dinner. This delightfully informal function, held in the Staff House of the University of Manchester on March 20th, was attended by some forty members and was presided over by Mr. W. J. Meredith, the newly elected Chairman of the Branch.

The guests were the President (Prof. W. E. Curtis), the Honorary Treasurer (Mr. E. R. Davies), the Honorary Secretary (Dr. B. P. Dudding), and the permanent Secretary of the Institute (Dr. H. R. Lang). Replying to the toast of the Institute, proposed by Prof. F. A. Vick, the President reminded the gathering that the objects of the Institute, laid down in its constitution, were "the elevation of the profession of physicist and the advancement and diffusion of a knowledge of physics, pure and applied." The ways and means employed to attain the second of these were well known. They included the many scientific meetings and conferences arranged by the Institute and its Branches and Groups, the two Journals and other publications and the important work of the Institute in the educational field—National Certificates in Applied Physics, Laboratory Arts Certificates and, in the near future, the new Graduate examination. The work in connexion with the first of the objects (the elevation of the profession) was, however, less well known, for it was widely spread and generally involved matters which are private and confidential. It appeared that the Institute's methods met with the approval of members and judging by the continually growing demand for its advice on professional matters, were appreciated by those who employed physicists or consulted them. The Institute's help and advice was regularly sought by several Ministries and Government establishments, by nationalized industries and by many industrial firms. The problems covered a wide range and the President gave some recent examples. The permanent officers were dealing with several members' cases a week about conditions of service, consulting fees, patent rights, post-graduate courses and careers, and so on. The Institute took an active part in the work of the Parliamentary and Scientific Committee and watched legislation likely to affect the profession—e.g. the Radioactive Substances Act and the Wireless Telegraphy Act.

The President spoke of the excellent corporate spirit shown by members, which enabled the Secretary, with confidence, to refer one member to another for expert advice and guidance. It was this spirit too that enabled the Benevolent Fund to do such valuable work to ease the lot of those members or their dependants who had met with misfortune, often of a most tragic nature.

Finally, the President reminded the gathering that the more representative the Institute was, the better it could carry out its work, and he suggested that the present members would be rendering the profession valuable service if they encouraged qualified physicists who had not yet joined the Institute to do so.

The toast of the guests was proposed by Dr. F. C. Toy. Mr. E. R. Davies replied, and Dr. B. P. Dudding was persuaded to say a few words. The Secretary answered some questions and the gathering then divided into small informal discussion groups.

"Proof is an idol before whom the pure mathematician tortures himself. In physics we are generally content to sacrifice before the lesser shrine of plausibility."

A. S. EDDINGTON.

APPOINTMENTS VACANT

The inclusion of particulars of a vacancy must not be taken to imply that the Institute necessarily approves of the terms offered or that might be offered. Candidates should satisfy themselves that these are satisfactory, and they may always refer to the Institute for advice.

A **Physical Chemist** or **Physicist** is required for research into application of ultrasonics to problems of detergency. Appointment is for Senior Scientific Officer in the salary range £700–£900. F.S.S.U. in operation. Apply, giving details of training and experience, to Director, **British Launderers' Research Association**, The Laboratories, Hill View Gardens, Hendon, N.W.4.

Moler Products Ltd., Hythe Works, Colchester, Essex, require for **technical management** a graduate in science, pure or applied. Qualifications must include a knowledge of engineering, applied mathematics, and physics. Some knowledge of chemistry an advantage. Additional professional qualifications also desirable. Interest in Works Production essential. Apply to the Managing Director at the above address stating experience (if any).

Applications are invited by the **Ministry of Supply** for the following unestablished appointments at the Royal Aircraft Establishment, Farnborough, Hants:—

Physicists or Mathematical Physicists

(1) *Principal Scientific Officer*. Candidates should have experience of radar systems analysis and war-time operational research. A strong mathematical bias is desirable, ref. A 133/51A.

(2) *Senior Scientific Officer*, for theoretical investigations. A knowledge of statistical methods is desirable, ref. A 134/51A.

Aeronautical Engineer

(3) *Senior Scientific Officer* with experience in planning and analysis of flight trials and application of results to project design. A knowledge of servo mechanism theory and practice is required, experience of liaison with industrial firms an advantage, ref. C 217/51A.

Physicists, Mathematicians, or Engineers

(4) *Senior Scientific Officer*, with research experience involving arithmetical applications of mathematics in the analysis of physical data, and the formulation of problems for solution by automatic computing machinery. A knowledge of aerodynamics an advantage, ref. A 135/51A.

(5) *Senior Scientific Officer*, with wide experience of methods of measurement in physics or engineering research, experience and up-to-date knowledge of electronics, ref. A 136/51A.

Candidates should have a first- or second-class honours degree in the appropriate subject and at least 3 years' post-graduate research experience is necessary. For the P.S.O. post candidates must be at least 31 years of age, for the S.S.O. posts at least 26 years. Salary will be determined on age and on an assessment of the successful candidates' qualifications and experience within the ranges:—Principal Scientific Officer—£960–£1,295. Senior Scientific Officer—£670–£860. Rates for women somewhat lower. Posts carry benefits of F.S.S.U. Application forms obtained from Ministry of Labour and National Service Technical and Scientific Register (K), York House, Kingsway, W.C.2, quoting appropriate reference number. Closing date May 24, 1951.

Electrical Engineers and **Physicists** are invited by the **Ministry of Supply** to apply for unestablished appointments in the grade of Senior Scientific Officer at the Royal Aircraft Establishment, Farnborough, Hants. Candidates should be at least 26 years of age and have a first- or second-class honours degree in the appropriate subject and at least 3 years' post-graduate research experience. They should also have a wide knowledge of communications work and H.F., V.H.F., or display techniques for research work associated with design and development of airborne and ground equipments. Salary will be determined on age and on an assessment of the successful candidate's qualifications and experience within the S.S.O. range £670–£860. Rates for women somewhat lower. Posts carry benefits of F.S.S.U. Application forms obtainable from Ministry of Labour and National Service Technical and Scientific Register (K), York House, Kingsway, W.C.2, quoting D 159/51—A. Closing date May 24, 1951.

Telecommunications Engineers and **Physicists** are invited by the **Ministry of Supply** to apply for unestablished appointments in the grade of Principal Scientific Officer or Senior Scientific Officer at the Royal Aircraft Establishment, Farnborough, Hants. Candidates should have a first- or second-class honours degree in physics or telecommunications and upwards of 5 years' experience of research and development in one of the following:—R.F. techniques at centimetric wavelengths; centimetric radar, preferably for airborne application; servo systems or telecommunication networks and feedback amplifiers. For the P.S.O. grade candidates must be at least 31 years of age and for the S.S.O. grade at least 26. Salary will be determined on age and on an assessment of the successful candidates' qualifications and experience within the ranges:—Principal Scientific Officer—£960–£1,295; Senior Scientific Officer—£670–£860. Rates for women somewhat lower. Posts carry benefits of F.S.S.U. Application forms obtainable from Ministry of Labour and National Service Technical and Scientific Register (K), York House, Kingsway, W.C.2, quoting D 158/51—A. Closing date May 24, 1951.

First-class opportunities for **Graduate Engineers** and **Physicists** with good honours degrees are available at the Research Laboratories of **The General Electric Co. Ltd.**, North Wembley, Middx. All vacancies will be for experimental or design work mainly in the fields of electronic and mechanical engineering. A limited number will be concerned primarily with vacuum physics. Openings will occur in three grades as follows:—

(*a*) Section Leaders—first-class experience is essential. Only men aged 27 or over, with proved ability to lead research teams will be considered.

(*b*) Post-Graduate research physicists and engineers who are completing their theses for advanced degrees this summer and who are seeking interesting experimental work in an industrial research laboratory.

(*c*) University students who will be sitting for Finals in physics or engineering during the next three months.

Starting salaries will be dependent on academic qualifications, age and experience, and prospects of advancement will be exceptionally good. Further particulars will be sent to all applicants who forward details of their record to the Personnel Officer (Ref. GBLC/192).

Interviews will be arranged during the next few weeks for graduates available between May and the end of September.

Electronic Engineers are invited to apply for appointments in the **Ministry of Supply** to work near London or at provincial stations on the development and design of electrically operated systems for a variety of applications, including weapons, telecommunications, and radar equipment. The responsibilities of the posts will vary according to the age, qualifications, and experience of the selected candidates, and acceptable qualifications range from first- or second-class honours degree in physics or light electrical engineering or equivalent qualifications, Corporate Membership of the Institution of Electrical Engineers to Higher School Certificate, Higher National Certificate, etc. Grade and entering salary will be determined after interview on ranges up to approximately £900 a year. Some posts carry F.S.S.U. benefits, but all are unestablished. Application forms obtainable from M.L.N.S. Technical and Scientific Register (K), York House, Kingsway, W.C.2, quoting D 134/51—A. Closing date May 24, 1951.

Kodak Limited has vacancies for young Physicists, interested in general physics and/or electronics. The posts are progressive and may lead to responsible posts in the Research Laboratory or in Manufacturing Departments. Non-contributory pension scheme. Salary £450–£650 according to qualifications and experience. Apply to Director of Research at the Works, Wealdstone, Harrow, Middx.

X-Ray Crystallographer required for Metallurgical Research Laboratory in West London Area. The salary will be in accordance with qualifications and experience and in the region of £550–£750. Apply stating age, qualifications, etc., to Box No. A.V.12, The Institute of Physics, 47 Belgrave Square, London, S.W.1.

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